

MONTHLY WEATHER REVIEW.

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INTRODUCTION.

The month of June has not been marked by any unusual meteorological features.

Severe local storms occurred in many of the states, but they were not as numerous or as violent as those which occurred during the preceding months, April and May.

The most important feature of the month was the destructive floods in the lower Missouri river and in the Mississippi river, between Saint Louis, Missouri, and Cairo, Illinois.

In the Missouri valley the rainfall exceeded the June average by nearly three inches. Large excesses also occurred in the middle and south Atlantic states. Large deficiencies occurred in the extreme northwest, southern slope, and north Pacific coast region.

The mean temperature of June has been above the normal on the Atlantic coast and west of the Rocky mountains, and below the normal over the interior districts, but the departures, in general, are small.

The weather over the north Atlantic ocean during the month was generally fair with high barometric pressure, but dense fogs prevailed from the coast of the United States eastward to the fortieth meridian.

Chart ii. shows the paths of the centres of but three atmospheric depressions, and these exhibited very slight energy.

The ice chart shows that during June icebergs have drifted about three degrees farther to the eastward than in May, while the southern limit remains on the same parallel.

In the preparation of this REVIEW, the following data, received up to July 20th, have been used; viz.: the regular tri-daily weather-charts, containing data of simultaneous observations taken at one hundred and thirty-one Signal-Service stations and fifteen Canadian stations, as telegraphed to this office; one hundred and seventy-six monthly journals, and one hundred and sixty-six monthly means from the former, and fifteen monthly means from the latter; two hundred and forty-one monthly registers from voluntary observers; fifty-one monthly registers from United States Army post surgeons; marine records; international simultaneous observations; marine reports, through the co-operation of the "New York Herald Weather Service;" abstracts of ships' logs, furnished by the publishers of "The New York Maritime Register;" monthly weather reports from the local weather services of Illinois, Indiana, Nebraska, New Jersey, and Tennessee, and of the Central Pacific railway company; trustworthy newspaper extracts; and special reports.

ATMOSPHERIC PRESSURE.

[Expressed in inches and hundredths.]

The distribution of mean atmospheric pressure for the month of June, 1883, determined from the tri-daily telegraphic observations of the Signal Service, is shown by the isobarometric lines on chart iii.

The regions of greatest mean pressure are the north Pacific coast, and the south Atlantic and Gulf states. In the north Pacific coast region, a small area is inclosed by the isobar of 30.05, the highest monthly means being 30.07 and 30.08, at Roseburg and Portland, Oregon, respectively. The high area covering the southeastern part of the country, is inclosed by the isobar of 30.0, which extends from eastern Texas to Virginia, and thence along the Atlantic coast to Nova Scotia. The highest barometric means recorded in this region were 30.05 at Cedar Keys and Jacksonville, Florida, and Augusta, Georgia.

The area of least mean pressure covers southern Arizona, New Mexico, southeastern Colorado, and western Texas. In southern Arizona, a small area is inclosed by the isobar of 29.75. The least monthly mean pressures, 29.74 and 29.75, are from Yuma and Camp Thomas, Arizona, respectively. Over the central Rocky mountains region, the extreme northwest, lake region, and Saint Lawrence valley, the monthly barometric means range from 29.80 to 29.90.

The mean atmospheric pressure of June, 1883, compared with that of the preceding month, shows a slight increase over the north Pacific coast region, and in the states bordering on the Atlantic. Over an area extending from western Illinois to eastern Colorado, and southward to the Texas coast, no change has occurred. In all other parts of the country, the mean pressure is below that of May, the changes being, in general, unimportant, but are most marked in the upper lake region, Arizona, and southern California, where they vary from .06 to .10.

DEPARTURES FROM THE NORMAL VALUES FOR THE MONTH.

On the Atlantic coast and west of the Missouri and lower Mississippi rivers, except in southern California, the mean pressure is above the June normal. The excess is greatest over the northern and middle slopes and in New England, the greatest departures being .08 at Boston, Massachusetts, and Fort Benton, Montana, and .09 at Denver, Colorado. Over an area extending from the lake region to the Gulf of Mexico the monthly barometric means vary from .01 to .07 below the normal, the departures being greatest in the lake region.

BAROMETRIC RANGES.

The monthly barometric ranges were greatest in New England, where they, generally, exceeded 1.00. They were least in Florida, along the Gulf coast, and in Arizona. Between the Mississippi river and Rocky mountains north of the thirty-fifth parallel, the ranges were very uniform and varied between .50 and .60. In the several districts the monthly ranges varied as follows:

New England.—From 0.97 at New Haven, Connecticut, to 1.12 at Portland, Maine.

Middle Atlantic states.—From 0.61 at Cape Henry and Lynchburg, Virginia, to 1.04 at Albany, New York.

South Atlantic states.—From 0.37 at Jacksonville, Florida, to 0.52 at Macon, North Carolina.

Florida peninsula.—From 0.20 at Key West, to 0.31 at Cedar Keys.

Eastern Gulf.—From 0.32 at Pensacola, Florida, and New Orleans, Louisiana, to 0.44 at Starkville, Mississippi.

Western Gulf.—From 0.38 at Galveston, Texas, to 0.54 at Fort Smith and Little Rock, Arkansas.

Ohio valley and Tennessee.—From 0.43 at Chattanooga and Knoxville, Tennessee, to 0.76 at Indianapolis, Indiana.

Lower lakes.—From 0.83 at Cleveland and Toledo, Ohio, to 0.96 at Oswego, New York.

Upper lakes.—From 0.60 at Duluth, Minnesota, to 0.88 at Port Huron, Michigan.

Extreme northwest.—From 0.56 at Fort Buford Dakota, to 0.71 at Saint Vincent, Minnesota.

Upper Mississippi valley.—From 0.53 at Des Moines, Iowa, to 0.71 at Springfield, Illinois.

Missouri valley.—From 0.53 at Yankton, Dakota, and Omaha, Nebraska, to 0.59 at Huron and Fort Bennett, Dakota.

Northern slope.—From 0.51 at North Platte, Nebraska, to 0.57 at Fort Shaw, Montana.

Middle slope.—From 0.49 at Fort Elliott, Texas, to 0.58 at Dodge City, Kansas, and West Las Animas, Colorado.

Southern slope.—From 0.47 at Coleman City, Texas, to 0.48 at Fort Concho, Texas.

Southern plateau.—From 0.29 at Prescott, Arizona to 0.40 at El Paso, Texas.

Northern plateau.—From 0.65 at Spokane Falls, Washington Territory, to 0.74 at Lewiston, Idaho.

North Pacific.—0.59 at Roseburg, Oregon, to 0.61 at Portland, Oregon.

Middle Pacific.—From 0.47 at San Francisco, California, to 0.57 at Sacramento, California.

South Pacific.—From 0.32 at San Diego, California, to 0.52 at Visalia, California.

AREAS OF HIGH BAROMETER.

Four areas of high barometer have been observed within or near the limits of the United States during the month of June. The centre of greatest pressure in each case passed eastward north of the Ohio valley.

I.—This was the most clearly marked area of high pressure observed during the month. On the morning of the 1st it extended over all districts east of the Mississippi river, attended by clear cool weather, the barometer reading highest, 30.36 in the lower lake region. This area moved directly east during the 1st, 2d, and 3d, passing over New England and over the Atlantic, south of Nova Scotia. The barometric pressure increased to 30.50 and above as this area approached the coast, and it was followed by the strong east to northeast winds at the coast stations south of New York. A small depression developed in northern North Carolina on the 2d, causing violent local storms and very heavy rains near Wilmington and Cape Hatteras. The barometer continued high on the Atlantic coast on the 4th, but it was falling, with southerly winds, in advance of low area i., which was central north of the lake region.

High area ii. appeared in the upper Missouri valley on the morning of the 12th, and moved southeastward, following the general course of this valley, until the afternoon of the 13th, when it passed to the east of the Mississippi river, over Illinois and the states north of the Ohio valley. It was central in the lower lake region on the 14th, and during the 15th and 16th, it passed over the middle Atlantic states and New England, with increasing pressure as the centre approached the coast. This area, after reaching the Ohio valley, moved to the east, following the course of high area i., but on the 16th, the region of greatest pressure was near Halifax, Nova Scotia. Cool, clear weather continued in the districts on the Atlantic coast during the 14th, 15th, and 16th, after the showers caused by the cold northwest winds which preceded the advance of this area on the night of the 13th.

III.—This area was at no time central within the limits of the stations of observation, but it apparently advanced from the north Atlantic, gradually extended westward over the stations northeast of the middle Atlantic states on the 25th, 26th, and 27th. The pressure increased in the region named, while low-area vii. remained almost stationary near Lake Erie during the 25th and 26th. This area was also followed by the development of a disturbance on the south Atlantic coast, as

in the case of high-area i., when the region of greatest pressure was to the northeast of the disturbance.

IV.—This was a very slight increase of pressure which appeared north of the upper lake region on the 30th. It moved southward without marked energy, causing a fall of from 5° to 10° in temperature in the northeastern part of the United States. At the close of the month, 11 p. m. of the 30th, the pressure was greatest, 30.10, in the Ohio valley. The July reports show that it passed over the southern portion of the middle Atlantic states to the south Atlantic coast, where it remained almost stationary during the 1st, 2d, and 3d of July, attended by very warm southerly winds and fair weather in the eastern portion of the United States.

AREAS OF LOW BAROMETER.

Eight areas of low barometer have been traced over the United States and adjoining territories during the month of June, and the month closed with a well-marked depression central north of Minnesota. The tracks of the centres of these depressions are exhibited on chart i. The telegraphic reports from stations west of the Rocky mountains having been discontinued on the 1st of June, it has not been possible to trace these storms to the westward, but the reports indicate that numbers i., v., vi., and vii., originated to the west of the field of observation. Numbers vi. and vii. disappeared within the limits of the stations before reaching the Atlantic coast.

The following table shows the latitudes and longitudes in which each depression was first and last observed, and the hourly velocity of each depression:

Areas of low barometer.	First observed.		Last observed.		Average velocity in miles per hour.
	Lat. N.	Long. W.	Lat. N.	Long. W.	
No. I.	0 / 40 00	0 / 104 00	0 / 47 00	0 / 82 00	25.0
II.	52 00	101 00	51 00	63 00	29.5
III.	37 00	95 00	45 00	70 00	28.0
IV.	35 00	97 00	49 00	65 00	25.5
V.	42 00	101 00	48 00	73 00	15.0
VI.	38 00	105 00	40 00	86 00	33.0
VII.	45 00	89 00	43 00	81 00	16.5
VIII.	34 00	78 00	40 00	73 00	21.0
IX.	55 00	102 00			
Mean hourly velocity.....					24.2

I.—At the morning report of the 1st, this disturbance was central in Colorado, where the barometer read 29.65 at Denver. A second depression existed to the north of Minnesota at this report, the pressure at the centre of this second disturbance being at least .10 lower than that reported at Denver. The afternoon report of the 1st indicated the advance of this depression towards the lake region, although the barometer continued low in eastern Colorado. The storm to the north had disappeared to the north of the lake region, and the pressure had increased to 30.11 in the upper Missouri valley, with cool northerly winds; and general rains on the Atlantic coast, with warm south to west winds. This depression left the coast, moving slightly north of east, near the fiftieth parallel of latitude. On the morning of the 2d, the cool northerly winds extended over Nebraska, and heavy rains were reported from Missouri, Iowa, and southern Dakota. At this report, the centre of disturbance was in northern Iowa, but the depression was elliptical in form and extended from Lake Superior to central Texas, bounded by the isobarometric line of 29.90, the barometer being 30.40 on the Atlantic coast and 30.20 in Manitoba. This storm increased in energy as it passed over the upper lake region on the 2d and 3d, but dangerous winds did not occur at stations south of Lake Superior. At Duluth, Minnesota, and Marquette, Michigan, the wind reached velocities of thirty-two and thirty miles, respectively, from northeast and northwest. This storm disappeared to the northeast of Lake Huron on the night of the 3d, but later reports show that it followed the Saint Lawrence valley to the northeast.

II.—This disturbance was at no time within the limits of the stations of observation, but the telegraphic reports from the northern stations show that it was central north of Minnesota, on the 5th, and that it passed almost directly east during the 6th and 7th. Light showers occurred in the lake region.

III.—The afternoon chart of the 8th, exhibited an extended barometric depression in the lower Missouri valley with general rains in Missouri and Iowa and adjoining states. The winds indicated that the centre of disturbance was near Springfield, Missouri, at this report. This storm increased in severity during the succeeding eight hours, the barometer falling below 29.60, and the bounding isobars contracting and assuming a circular form. The rainfall in the central Mississippi valley was very heavy on the 8th. During the 9th, this storm passed over the southern portion of Michigan, over lake Huron, and north of the lower lake region, where it was central at the 11 p. m., observation of that day. Signals were ordered in advance at stations on Lakes Michigan and Huron, and at Detroit, but were only justified at Milwaukee and Detroit. After reaching the upper Saint Lawrence valley, this area moved eastward to the New England coast, where it disappeared on the afternoon of the 10th.

IV.—When the preceding disturbance moved northeastward from Missouri the pressure remained below the normal in the west Gulf states, and the cool winds from the north following storm number iii., resulted in the development of a second storm in the southwest on the following day. Very heavy rains occurred in the central Mississippi valley on the 10th, when this area was central in Missouri. The barometer was low in all districts at the afternoon report of the 10th, attended by general rains in the Gulf states and thence northward over the lake region, the centre of disturbance being in central Illinois. This storm continued its northeasterly course until it finally disappeared to the northeast of the Canadian stations, increasing greatly in energy as it passed over the lake region. When central near lake Huron the pressure at the centre was below 29.30, and dangerous winds were reported from stations on Lake Erie on the 11th. During the night of the 11th this storm inclined to the eastward, the centre passing to the east of the Saint Lawrence river to northern New England, after which it moved to the northeast and disappeared, the barometer being unusually low at the maritime stations on the 12th.

V.—This depression was first observed on the northern slope of the Rocky mountains on the 17th, but the reports indicate that it developed over the middle or southern plateau during the 15th and 16th. Moving eastward to the Missouri valley, where it was central near Omaha, Nebraska, at the afternoon report of the 17th, the course changed to the northeast, and during the night it passed over western Iowa and southern Minnesota, causing violent local storms and very heavy rains generally throughout the northwest and upper lake region. The centre passed over Lake Superior, near Marquette, Michigan, on the morning of the 18th, when the barometer fell to 29.50, and the winds became dangerous after shifting to the northwest. After passing to the north of the lake region, this storm remained almost stationary during the 19th and 20th, and finally disappeared before reaching the Atlantic coast, by a gradual increase of pressure in the northern districts.

Low area vi. developed in the middle plateau region on the 19th, but at no time was it well defined. The barometer fell to 29.70 at Denver, Colorado, on the 19th, and to 29.67 at North Platte, Nebraska, at the morning report of the 20th, accompanied by thunder storms and rain in the Missouri valley and Kansas. These storms advanced over Iowa, Missouri, and Illinois, during the 20th, when the centre of disturbance was in Missouri. The rains caused by this slight depression were very heavy in the central Mississippi and lower Ohio valleys, but it lost energy and was last observed in the lower Ohio valley, where it disappeared on the morning of the 21st.

VII.—This is the most marked depression of the month, owing to its unusual retardation after the centre reached the

lower lake region. It apparently developed near Lake Superior on the afternoon of the 23d and moved southeastward to the southern part of Lake Michigan, and thence to the northeast, the centre being immediately north of Lake Huron at 7 a. m. of the 24th. The central depression extended to the southward, covering the Ohio valley, and the barometric trough was thus located between an advancing high area in the northwest and a second high area which approached the Atlantic coast from the northeast. This distribution of pressure continued until the 26th, the area of low barometer becoming more contracted and remaining almost stationary near Lake Erie until the area of high pressure to the east had advanced over the Atlantic and the barometer fell at the Canadian stations, when the pressure rose slowly in the lake region.

VIII.—This was a secondary disturbance which formed over the south Atlantic coast immediately after the disappearance of low area vii. Its development was probably due to the southerly movement of the high area referred to in description of low area vii. This depression moved northward along the middle Atlantic coast, causing violent local storms near the coast. The following maximum wind-velocities occurred at the coast stations during this storm: Cape May, New Jersey, 50, nw.; Delaware Breakwater, Delaware, 48, nw.; Sandy Hook, New Jersey, 42, E.; Hatteras, North Carolina, 38, se.; Cape Henry, Virginia, 42, nw. This disturbance could not be traced to the north of the middle Atlantic coast, as it probably lost much of its energy and disappeared near Sandy Hook, New Jersey.

NORTH ATLANTIC STORMS DURING JUNE, 1883.

[Pressure expressed in inches and in millimetres; wind-force by scale of 0—10.]

Chart ii. exhibits the tracks of the principal depressions that have moved over the north Atlantic ocean during June, 1883. The location of the various storm-centres has been approximately determined from reports of observations furnished by agents and captains of ocean steamships and sailing vessels in the north Atlantic, and from other miscellaneous data received at this office up to July 21st. The observations used are, in general, simultaneous, being taken each day at 7 h. 0 m. a. m., Washington, or 0 h. 8 m. p. m., Greenwich mean time.

For the month of June, 1883, the approximate paths of three areas of barometric disturbance are charted; these are all east of the twenty-fifth meridian. None of the depressions traced to the coasts of the United States and Canada, (chart i.,) have remained sufficiently well-defined, within the range of observation, to warrant a farther tracing of their paths; but numerous small, shallow depressions appear to have prevailed over the Atlantic during the month. These were of short duration and of limited extent, and did not exert any marked influence over the weather, beyond causing occasional rains and sudden changes of the wind, which, generally, did not exceed the force of a strong breeze or moderate gale.

The weather conditions over the Atlantic during the month may be summarized as follows: from the 1st to 8th, generally fair, with light to moderate breezes, variable in direction. From the 8th to 23d, generally light to moderate breezes, occasional rains and dense fogs from the fortieth meridian westward. From the 23d to the close of the month, cloudy weather and stormy breezes, increasing at times to moderate gales, prevailed to the eastward of W. 35°.

The barometric pressure was, in general, high throughout the month, particularly so in mid-ocean during the period from the 14th to 22d. Captain Hughes, of the s. s. "Alene," reported the barometric pressure as ranging from 30.4 (772.1) to 30.9 (784.8) from the 2d to 14th at the various ports in Hayti.

In connection with the subject of fog, Captain Brooks, of the s. s. "Arizona," reported having steamed through no less than 1,500 miles of fog during the voyage from Queenstown to New York, June 17th to 24th.

The following diagram shows the weather conditions over the Atlantic during the period from May 27th to June 11th, as reported by Captain Brown, of the s. s. "Assyria," on the passage from New York to Bristol: